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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/546,260 04/10/00 EDGAR

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EXAMINER

QM12/0906

PAUL C OESTREICH
TRASK BRITT & ROSSA
P O BOX 2550
SALT LAKE CITY UT 84110

KREMER, M

ART UNIT

PAPER NUMBER

3736

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/546,260

Applicant(s)

EDGAR ET AL.

Examiner

Matthew J Kremer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 14-48 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Claim Objections

1. Claim 28 is objected to because of the following informalities: the word "is" is missing between "peak" and "not" in line 21. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention. Claim 6 is in the improper format for a Markush group. To correct the error, the claim should read "a technique selected from the group consisting of".

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

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5. Claims 1-5, 7-8, 18-26, 30-42, and 44-48 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,122,535 to Kaestle et al. Kaestle et al. discloses a method for determining the concentration of a component. In column 4, lines 60-66, Kaestle et al. states that electric raw signals are obtained on the basis of the intensity of electromagnetic waves at selected wavelengths. In column 5, lines 46-52 of Kaestle et al., the signals in the time domain are subjected to a time-discrete transformation in the frequency domain, particularly the fast Fourier transformation (FFT) as seen in Fig. 3. The spectrum is examined to identify peak areas based on various criteria as stated in column 7, line 40 to column 9, line 30. The identified peaks are classified using special relevance criteria as described in column 9, line 55 to column 11, line 16. A particular peak is identified as the pulse rate. The previous determined peak is used if none of the current peaks are viable candidates (column 11, lines 30-37). In regard to claims 2-5 and 31, the fast Fourier transform is used with the cos-shaped Hanning window (column 5, lines 47-67). In regard to claims 7, 27, and 32, the highest peaks are identified using the maximum criterion (column 7, line 63 to column 8, line 14). The maximum number of peaks is 10 peaks. In regard to claim 8, an example shows 5 peaks which are identified and examined in the table in column 8. In regard to claims 18-26 and 33-36, Kaestle et al. discloses the special relevance criteria that is used for classifying peaks (column 9, line 59 to column 11, lines 16). For each peak, Kaestle et al teaches the following properties: the pulse rate (claims 18 and 33) in column 10, lines 20-23, pulse width variability (claims 19 and 34) and saturation variability (claims 20 and 35) in column 10, line 59 to column 11, line 5, saturation value (claim 21) in column 10, lines

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17-18, and pulse rate history based on the previous run (claims 22 and 38) in column 10, lines 48-54. In regard to claims 23-24, the peak is scored and ranked to determine the best peak which indicate window confidence. In regard to claim 30, one wavelength is in the red spectrum and another is in the infrared spectrum (column 4, lines 32-52). In regard to claim 36, the measure of asymmetry of a peak is defined in column 9, lines 8-15. In regard to claim 37, a measure of the relative height of the peak is given in column 9, lines 1-2. In regard to claims 44-48, the oximeter disclosed by Kaestle includes a sensor device for transmitting and receiving red and infrared wavelengths, an analog to digital converter, and a microprocessor working under a program memory (column 4, lines 31-52).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,122,535 to Kaestle et al. as applied to claim 1 in view of U.S. Patent 5,830,137 to Scharf. Kaestle et al. teaches transforming time-dependent electric signals into the frequency domain (column 7, lines 32-53). Kaestle et al. further teaches that a Fourier transform is used (column 7, lines 54-65). Kaestle et al. does not teach the use of

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periodogram, correlogram, autoregressive method, Prony's method, minimum variance method, maximum likelihood method, a discrete cosine transform, a wavelet transform, a discrete Hartley transform, or a Gabor transform. Scharf teaches that the FFT has many substitutions including the discrete cosine transform, the wavelet transform, the discrete Hartley transform, and the Gabor Spectrogram which can be used to place data in the frequency domain. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the discrete cosine transform, the wavelet transform, the discrete Hartley transform, or the Gabor Spectrogram for the fast Fourier transform since Scharf states that these transforms are substitutions for the fast Fourier transform.

8. Claims 9-10, 12, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,122,535 to Kaestle et al. as applied to claim 1 in view of U.S. Patent 5,621,730 to Kelley. Kaestle et al. teaches isolating a candidate peak and subjecting that peak to criteria (column 8, lines 2-3 and lines 35-37). Kaestle et al. does not teach a process of isolating the peaks. Kelley teaches a method of reading a digitized signal, using a digital tuner which selects multiple frequencies in the digitized signal (column 2, lines 52-58 of Kaestle et al.) and isolates them. The method of Kelly would provide the necessary function of isolating peaks at certain frequencies as stated in Kaestle et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the method of isolating multiple frequencies as disclosed by Kelley for the undisclosed method of isolating the

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frequencies of Kaestle et al. since they are functionally equivalent and it has generally been held to be within the skill level of the art to substitute elements that are functionally equivalent. In regard to claim 10, a multiplexed FIR is used (column 3, lines 59-61). In regard to claim 12, multiple FIR filters are used (column 2, lines 59-66).

9. Claims 11 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,122,535 to Kaestle et al. as applied to claim 1 in view of U.S. Patent 6,061,582 to Small et al. Kaestle et al. teaches isolating a candidate peak and subjecting that peak to criteria (column 8, lines 2-3 and lines 35-37). Kaestle et al. does not teach a process of isolating the peaks. Small et al. teaches a method of digitally filtering collected data to isolate a portion of data (column 2, lines 15-16). Small et al. further teaches that electronic filters to select for specified wavelengths are common place (column 6, lines 62-64). It is well known in the art that wavelengths are related to frequency and if a wavelength can be isolated so can its frequency. The method of Small et al. would provide the necessary function of isolating peaks at certain frequencies as stated in Kaestle et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the method of filtering to isolate a portion of data as disclosed by Small et al. for the undisclosed method of isolating the frequencies of Kaestle et al. since they are functionally equivalent and it has generally been held to be within the skill level of the art to substitute elements that are functionally equivalent. In regard to claim 11, an infinite impulse response filter can be used (column 4, lines 52-56). In response to claim 17,

the method of digitally filtering involves transforming using a Fourier transform, a Gaussian function that weighs spectral information, and an inverse Fourier transform (column 4, lines 26-51).

10. Claims 28-29 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,122,535 to Kaestle et al. as applied to claims 27 and 42. In regard to claim 28-29, Kaestle et al. does not teach: (1) if the peak pulse window confidence is less than the pulse window confidence for either the primary or secondary candidate peaks, then the tertiary candidate peak is the best frequency; (2) if the primary candidate peak pulse window confidence is greater than the secondary candidate peak pulse window confidence by a first threshold and the primary candidate peak pulse history percentage is greater than a second threshold then the primary candidate peak is the best frequency; (3) if the secondary candidate peak frequency is a rough harmonic of the primary candidate peak frequency and the pulse window confidence of the primary candidate peak is not more than a specified number of points greater than the pulse window confidence of the secondary candidate peak, then the primary candidate peak is accepted; and (4) if the pulse window confidence of the primary candidate peak is no more than a specified number of points greater than the pulse window confidence of the secondary candidate peak, then the primary candidate peak is the best frequency, otherwise, the secondary candidate peak is the best frequency. Kaestle et al. does teach that the method can use some of the criteria, define limits for the criteria in a different way, and to award points differently (column 9, lines 59-65).

Different awarding systems and limitations of criteria would be obvious to one skilled in the art for determination of best frequencies such as changing the scaling so instead of the highest number having the greatest confidence score, the lowest number would.

Different awarding systems of numbers would also lead to various choices for best frequency that would be consistent with the choosing of best frequency as indicated above. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Kaestle to use different scoring and limitations of criteria since Kaestle stated that other scoring numbering can be used. In regard to claim 43, Kaestle teaches that the method analyzes up to 10 peaks with a range in frequency of 0.5 Hz to 10 Hz (column 8, lines 4-15 of Kaestle et al.). Kaestle further teaches that no peaks may be viable candidates (column 11, lines 30-37). One who is skilled in the art can reasonably choose a number of peaks that would satisfy the analysis within the range of 0-10 peaks which is suggested from the information supplied in Kaestle et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of the combination to analyze two peaks since one who is skilled in the art can choose a different number between 0-10 peaks as suggested from the information from Kaestle et al.

Allowable Subject Matter

11. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter. In regard to claim 13, the combination analyzes up to 10 peaks with a range in frequency of 0.5 Hz to 10 Hz (column 8, lines 4-15 of Kaestle et al.). An example of 5 peaks is shown in the table in column 8. One who is skilled in the art can reasonably choose a number of peaks that would satisfy the analysis within the range of 5-10 which is suggested from the information supplied in Kaestle et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of the combination to analyze 8 peaks since one who is skilled in the art can choose a different number and the information from Kaestle et al. suggests a range of 5-10. The prior art does not teach or suggest that the band filters are separated by a fixed difference in frequency.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 5,299,120 to Kaestle discloses a method for digitally processing signals containing information regarding arterial blood flow in a living body. The method comprises the steps of identifying a first edge based on a first derivation of

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the signal, disregarding same if it does not fulfill certain criteria, determining a window based on the identified first edge, identifying the second edge falling within the window, disregarding same if it does not fulfill certain criteria, and replacing the second edge by the first before repeating these steps. U.S. Patent 6,098,038 to Hermansky et al. discloses a method and system for adaptively filtering a speech signal in order to suppress noise in the signal. The method includes decomposing the signal into multiple frequency subbands, each having a center frequency, estimating a signal -to-noise ratio for each subband, and providing multiple filters with each filter designed for one of a number of selected signal -to-noise ratios independent of the center frequencies of the subbands. U.S. Patent 5,852,638 to Chen et al. discloses a method and apparatus which receives a symbol and subdivides the symbol into a plurality of fragments.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Kremer whose telephone number is 703-605-0421. The examiner can normally be reached on Mon. through Fri. between 7:30 a.m. - 4:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eric Winakur can be reached on 703-308-3940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-0758 for regular communications and 703-308-0758 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0858.



Matthew Kremer
Examiner
Art Unit 3736
September 5, 2001



ERIC F. WINAKUR
PRIMARY EXAMINER